

TITLE: COMPUTER AIDED CIGARETTE DESIGN

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ABSTRACT: A computer aided cigarette design system which simulates the effects of cigarette construction on smoke delivery is presented. Cigarette construction comprises properties such as air permeability of cigarette paper, degree of filter ventilation, geometrical data, weight and pressure drop of tobacco rod, filter pressure drop and filter efficiency. The main applications are: (1) proposals for several alternative design solutions when the type of blend and the target values for some smoke components (e.g., condensate and nicotine) are given and (2) the prediction and explanation of the effects of design alterations on the smoke deliveries of current brands. For these purposes the system consists of two components: (a) a data bank for material properties and (b) a computer model for cigarette design. This model incorporates all processes within the cigarette which influence the deliveries of those smoke components which are of special interest. These processes imply combustion, ventilation, diffusion and filtration. They are treated partly on the basis of regressions and partly on the basis of the appropriate physical theories. The latter amplify the range of the applicability of the design model. The choice of different design solutions is dependent on the given criteria.

REVIEW: This paper explained the use of several computer programs designed to predict cigarette characteristics at given cigarette parameters. The programs were derived from previously established equations explaining cigarette design. Several parameters that can be used to predict cigarette characteristics include ventilation, puff count and filter efficiency. The manipulation of the parameters by the computer programs allows different models to be predicted. The best model can then be chosen for production. Correlation of actual and predicted data for tar, nicotine, CO and puff count was excellent. The computer program can also be applied to blend development.

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